

A Revision of the Tribe Anthidiini (Hymenoptera, Megachilidae) in Korea

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Abstract The bees belonging in the tribe Anthidiini from Korea were revised, five genera six species were recorded and given the key to genera and species. Among them, *L. malaisei* Popov and *S. melanura* Cockerell were new to Korea.

Key words Taxonomy, Megachilidae, Anthidiini, *Anthidium*, *Anthidiellum*, *Lasanthidium*, *Euaspis*, *Stelis*, Korea

INTRODUCTION

The tribe Anthidiini contains megachilid bees with characters as follows: fore wing with 2nd recurrent vein terminates beyond tip of 2nd submarginal cell or its interstitial; claw of female cleft.

Yasumatsu (1937) recorded *Euaspis basalis* Ritsema and *E. carbonaria* Smith for the first time from Korea and he (1939) added three species, *Anthidium septemspinosum* Lepeletier, *Dianthidium sibiricum* (Eversmann) (= > *Anthidium sibiricum*), and *Dianthidium strigatum* Panzer (= > *Anthidiellum strigatum*). Among them, *E. carbonaria* was identified as *Stelis melanura* Cockerell in this study. Kim (1963, 1970) described four species, *Anthidium japonica* Smith, *Anthidium septemspinosum* Lepeletier, *Euaspis carbonaria* Smith, and *Euaspis basalis* Ritsema. *A. japonica* was a synonym of *Anthidium septemspinosum*. whereas *Euaspis carbonaria* was revealed as *Lasanthidium malaisei* after re-examination of the specimen which he (1970) used for description. As a result of previous studies, only the above three species were reported from Korea currently.

Materials examined are on the basis of the collections of the following institutions (abbreviations in bracket): College of Agriculture and Life sciences Seoul National University, Suwon [ASNU]; National Institute of Agricultural Science and Technology, Suwon [NIAS]; Sungshin Women's University, Seoul [SWU]; Yungnam University, Kyungsan [YN]. Abbreviations for the provincial names are as follow: GG- Gyeonggi; GW- Gangweon; CB- Chungbuk; CN- Chungnam; GB- Gyeongbuk; GN- Gyeongnam; HB- Hambuk; JB- Jeonbuk; JN- Jeonnam.

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SYSTEMATICS

Tribe Anthidiini Michener, 1944 알락가위벌족 (신칭)

Diagnosis. Black with yellow or reddish-yellow maculation, or completely black, seldom reddish in metasoma. Length of body from 6–9 to 14–19 mm. Mandibles usually wide in female, with 3–6 teeth apically. Inner margin of pterostigma longer than width of pterostigma. 2nd recurrent vein terminates beyond tip of 2nd submarginal cell or its interstitial. Claw of female cleft. Abdominal terga with yellow maculation, band or completely black. In male, tergum 7 with large teeth, lobes, spinelike elongate, or broadly rounded apically.

Key to the genera of the tribe Anthidiini in Korea

1. Terga of metasoma without yellow maculations; Female without scopa on metasomal sterna 2
 – Terga of metasoma with yellow maculations; Female with scopa on metasomal sterna 3
2. Body color entirely black without any red color; Face with only a small ridge Genus *Stelis*
 – Metasoma red except for 1st segment black; Face with three longitudinal carinae between scape
 Genus *Euaspis*
3. Arolium absent; Mandible of female with 5 sharp teeth separated by acute notches, 7th tergum of male with emargination Genus *Anthidium*
 – Arolium present; Mandible of female with 3–4 teeth; 7th tergum of male without emargination 4
4. Scutellum with two lamellate projection posteriorly Genus *Anthidiellum*
 – Scutellum without two lamellate projection posteriorly; 7th tergum of male with denticles
 Genus *Lasanthidium*

Genus *Anthidiellum* Cockerell, 1904

Anthidiellum Cockerell, 1904. Bull. of South. California Acad. Sc. 3: 3. Type species: *Trachusa strigata* Panzer, 1805.

Cerianthidium Friese, 1923. Die europäischen Bienen: 304. Type species: *Trachusa strigata* Panzer, 1805.

Diagnosis. Black, with yellow maculation and short light pubescence. Body robust, length 6–8 mm. Head rounded, nearly of equal width and length. In female clypeus black or with yellow maculate, in male completely yellow. Mandibles wide apically, 4-dentate in females, 3-dentate in male. Propodeum covered with scutellum. First metasomal tergum concave at anterior part, with a carina separating this concavity from dorsal surface. Metasoma oval-rounded, with yellow maculae laterally or with yellow bands on terga 3–5 in female and 3–6 in male. Tergum 6 in female and tergum 7 in male completely yellow or black, with yellow maculae. Scopa light. Tergum 7 in male triangular with a spine apically. Legs yellow or reddish yellow, arolia on last tarsal segments developed.

The genus *Anthidiellum* is widely distributed in the Palaearctic and Australian zoogeographic regions.

Subgenus *Anthidiellum* Cockerell, 1904

Anthidiellum Cockerell, 1904. Bull. of South. California Ac. Sci. 3: 3. Type species: *Trachusa strigata* Panzer, 1805.

***Anthidiellum (Anthidiellum) strigatum* (Panzer, 1805) 동글알락가위벌 (신칭)**

(Figs 4, 15, 16)

Trachusa strigata Panzer, 1805: 86.

Anthidium strigata: Panzer, 1806: 250.

Anthophora strigata: Illiger, 1806: 118.

Megachile strigata: Spinola, 1808: 203.

Anthidium scapulare Schenck, 1851: 71.

Anthidium minusculum Nylander, 1852: 276.

Dianthidium strigatum: Cockerell, 1900: 412; Yasumatsu, 1939: 4; Romankova, 1995: 533; Banaszak et Romasenko, 1998: 56.

Anthidiellum strigatum: Cockerell, 1904: 3.

Description. Female– Mandibles with 4 teeth; clypeus black. Scutellum with two yellow lamella-like projections posteriorly. Tibia and tarsi reddish yellow; arolium present. Metasomal terga 1–5 with a yellow maculation in each side.

Male– Similar to female. Clypeus and outer regions of antennal sockets yellow.

Body length. Female– about 8 mm, male– 8 mm.

Materials examined. [ASNU] <CB> 3♀, Mt. Wolak 12 VII 1983 (Woo); [YU] <GB> 1♀, Mt. Taechangsan, 27 VII 1984 (C.W.Kim); 1♀, Kyungsan, 27 1994 (H.M. Kim); [NIAS] <CB> 1♂, Bugam Sanoe Boeun, 30 VII 1998 (S.H. Lee) (on *Potentilla fruticosa*); 2♂, Neureumjae Geommul Goesan, 30. VII 1998 (S.H. Lee) (on *Potentilla fruticosa*); 2♂, Dandongri Cheongpung Jecheon, 31 VII 1998 (D.P. Lyu) (on *Leonurus sibiricus*).

Previous locality. Mt. Keumkangsan (GW).

Distribution. Korea (North, Central, South), China, Russia, Europe.

Remarks. This species was omitted in Anonymous (1994), however, already recorded from Korea by Yasumatsu (1939).

Genus *Anthidium* Fabricius, 1805 알락가위벌속

Anthidium Fabricius, 1805, Syst. Piez: 364. Type species: *Apis manicatum* Linnaeus, 1758.

Diagnosis. Body color black with yellow, reddish–yellow or whitish maculation and dense pubescence. Body robust, length 10–16. Head as wide as thorax. Clypeus usually convex and yellow. In female mandibles 6–dentate; in male with 3 large teeth, sometimes 4 denticles. Thorax rounded. First metasomal tergum with a concave anterior part separated by a carina from dorsal surface. Metasomal terga with yellow maculae laterally or with bands, sometimes interrupted in middle. Scopa of female white, yellowish or reddish. Legs with yellow maculae or completely yellow, reddish–yellow. In male

tergum 7 with lobes or teeth, tergum 6 usually with teeth laterally.

The genus *Anthidium* is widely distributed in the Holoartic region.

Key to the Korean species of the genus *Anthidium*

1. Larger, body length, 14–18 mm *A. septemspinosum*
 – Smaller, body length, 6–8 mm *A. sibiricum*

Subgenus *Anthidium* Fabricius, 1805

Anthidium Fabricius, 1805, Syst. Piez: 364. Type species: *Apis manicatum* Linnaeus, 1758

***Anthidium (Anthidium) septemspinosum* Lepeletier, 1841 열점박이알락가위벌 (개칭)** (Figs 1, 2, 9, 10)

Anthidium septemspinosum Lepeletier, 1841: 359; Yasumatsu, 1939: 2; Kim, 1963: 367; Kim, 1970: 686, 827; Anonymous, 1994: 267; Romankova, 1995: 533.

Anthidium nigripes Eversmann, 1852: 81.

Anthidium nigriceps Smith, 1854: 203.

Anthidium japonicum Smith, 1879: 86; Doi, 1938: 39; Kim, 1963: 367; Kim, 1970: 686, 827; Anonymous, 1994: 267.

Description. Female– Mandible with 5 teeth; clypeus black; vertex with yellow markings on the lateral posterior regions. Arolium absent. Metasomal terga 1–5 with a yellow maculation on each side. Male – Larger than female. Clypeus and lower part of paraocular region yellow. Metasomal terga 1–6 with yellow maculation on each side. Tergum 7 largely emarginate with a denticle in the middle.

Body length. Female– 14–16 mm, Male– 16–18 mm.

Materials examined. [ASNU] <GG> 1 ♂, Suwon, 3 VIII 1989 (S.D. Lee); 1 ♂, Seoul, 7 IX 1997 (H.J. Ahn); 1 ♀, Yangju, 20 VII 1997 (Y.J. Lee); <GB> 1 ♀, 1 ♂, Uiseong, 31 V 1998 (H.S. Lee), Nest trap; <JN> 1 ♀, Mt. Jirisan, 1 VIII 1959 (Paik); [NIAS] <GG> 1 ♀, Suwon, 5 VIII 1995 (S.H. Lee) (on *Lycium chinense*); 56 ♂ 2 ♀, ditto, 11 VIII. 1995 (S.H. Lee); 1 ♂ 5 ♀, ditto, 11 IX 1995 (S.H. Lee); 2 ♂ 4 ♀, Mt. Yeogisan Suwon, 21 IX 1998 (D.P. Lyu); <CB> 1 ♀, Neureumjae Geommul Goesan, 30 VII 1998 (S.H. Lee) (on *Potentilla fruticosa*); <CN> 2 ♂ 3 ♀, Yeonhuweon Geumma Hongseong, 13 VIII 1998 (S.H. Lee) (on *Lespedeza bicolor*); <JB> 2 ♂, Goraengji Namweon, 15 IX 1998 (J.Y. Choi) (on *Digitaria sanguinalis*); [SWU] <GG> 1 ♂, Mt. Kodongsan, 9 IX 1980 (G.W. Jang); 1 ♂, Songmakcheon, 17 VIII 1991 (Y.H. Lee); <CB> 1 ♀, Boeun, 15 VIII 1991. (S.M. Kim.).

Previous locality. Seoul, Mt. Soyosan, Mt. Songnisan, Mt. Kayasan, Mt. Jirisan.

Distribution. Korea, Japan, China, Russia, Europe.

Subgenus *Dianthidium* Cockerell, 1900

Dianthidium Cockerell, 1900, Ann. Mag. Nat. His., s.7,5: 412. Type species: *Anthidium curvatum* Smith, 854.

***Anthidium (Danthidium) sibiricum (Eversmann, 1852)* 꼬마알락가위벌 (신칭)**

(Figs 3, 11)

Anthidium sibiricum Eversmann, 1852: 85.*Danthidium sibiricum*: Cockerell, 1924: 526; Yasumatsu, 1939: 4; Romankova, 1995: 533.*Anthidium (Proanthidium) sibiricum*: Gusskovskoj, 1932: 10, 59.

Description. Female– Small and slender species. Clypeus entirely black; face with two yellow maculations. Metasomal terga 1–5 with yellow markings on each side.

Male– Similar to female. Clypeus and paraocular regions yellow (according to the Russian specimens).

Body length. Female– 8 mm, male– 8 mm.

Materials examined. [ASNU] <CB> 1 ♀, Mt. Songnisan, 24 VII 1960 (Paik); <JB> 1 ♀, Mt. Naejangsan, 1 VIII 1974 (J.I. Kim). [YU] <GW> 1 ♀, Mt. Bangtaesan, 15 VIII 1995 (J.G. Kim); <GB> 1 ♀, Youngcheon, 27 V 1988 (H.G. Kim).

Previous locality. Musan (HB).

Distribution. Korea, China (Manchuria), Russia.

Remarks. This species was omitted in Anonymous (1994), however, already recorded from Korea by Yasumatsu (1939). The male specimen from Korea was not available, so the Russian specimen was used for description.

Genus *Euaspi* Gerstaecker, 1857

Euaspi Gerstaecker, 1857, Monat., Akad. der Wissensch.: 460. Type species: *Thynnus abdominalis* Fabricius, 1793.

Diagnosis. Black with reddish metasoma and dense pubescence. Body robust, length 10–16. Head as wide as thorax. Clypeus usually convex and black. Face with carinae between antennal sockets. Thorax rounded. Metasoma usually reddish. Scopa of females absent. Legs black. In male tergum 7 rounded; sternum with spines.

The genus *Euaspi* is widely distributed in Afro-oriental and part of Palaearctic regions.

Subgenus *Parevaspi* Ritsema, 1874

Parevaspi Ritsema, 1874. Tijdschr. v.r Entom. 17: 1xxi.

Euaspi subg. *Parevaspi* Vachal, 1903. Bull. Soc. Ent. France: 97. Type species: *Parevaspi basalis* Ritsema, 1874.

***Euaspi (Parevaspi) basalis Ritsema, 1874* 주홍배가위벌**

(Figs 8, 17)

Paraevaspi basalis Ritsema, 1874: 1xxi.

Euaspi (Parevaspi) basalis: Vachal, 1903: 97; Yasumatsu, 1937: 145; Kim, 1963: 369; Kim, 1970: 694, 828; Anonymous, 1994: 267.

Description. Female- Robust, larger sized. Body black except for metasoma 2-6 red; Face with three longitudinal carinae between antennal sockets. Clypeus black and with dense and coarse punctures. Male - Similar to female, smaller than female.

Body length. Female- 12-14 mm Male- 10 mm.

Materials examined. [ASNU] <JN> 1 ♂, Piagol Mt. Jirisan, 9 IX 1998 (H.S. Lee); 1 ♀, Mt. Jirisan Early of V 1959 (Paik); [NIAS] <GG> 3 ♂, Mt. Taehwasan Gwangju, 5 VIII 1998 (S.H. Lee) (on *Zanthoxylum schinifolium*). [SWU] <GG> 1 ♀, Mt. Cheonmasan, 10 VIII 1983 (H.S. Park); <CB> 1 ♀, Jecheon, 22 VIII 1984 (Y.S. Han.); [SWU] <GG> 1 ♀, Mt. Cheonmasan, 10 VIII 1983 (H.S. Park); <CB> 1 ♀, Jecheon, 22 VIII 1984 (Y.S. Han.).

Previous locality. Pyeongyang, Seoul, Mt. Soyosan, Gwangneung, Mt. Kayasan, Andong.

Distribution. Korea, Japan, China, Russia.

Remarks. This species is a cuckoo bee of *Chalicodoma sculpturalis* Smith.

Genus *Lasanthidium* Romankova, 1988

Lasanthidium Romankova, 1988, Vestnik Zoologii 1988 (4): 26. Type species: *Stelis malaisei* Popov, 1941.

Diagnosis. Black with yellow markings. Robust, length 6-10 mm. Head rounded, Clypeus convex and black in females with yellow line at each side and yellowish in males. Thorax rounded. The two projections of scutellum with yellow lines. Metasomal terga with yellow maculae. In male, 7th tergum with 3 denticles.

***Lasanthidium malaisei* (Popov, 1941) 줄알락가위벌 (신칭)**

(Figs 5, 6, 12, 13)

Stelis malaisei Popov, 1941: 223.

Lasanthidium malaisei: Romankova, 1988: 26.

Euaspiis carbonaria Kim, 1970 (nec Smith, 1854): 694 (misident.).

Description. Female- Small sized and rather robust. Clypeus black. Body black except for yellow markings as follow: two line from each side of clypeus through side margin of compound eye to beneath of vertex, pronotum, taegulae, tibiae and tarsi of three legs, two bars of scutellum maculation in each side of metasomal terga 1-2 and line of metasomal terga 3-5.

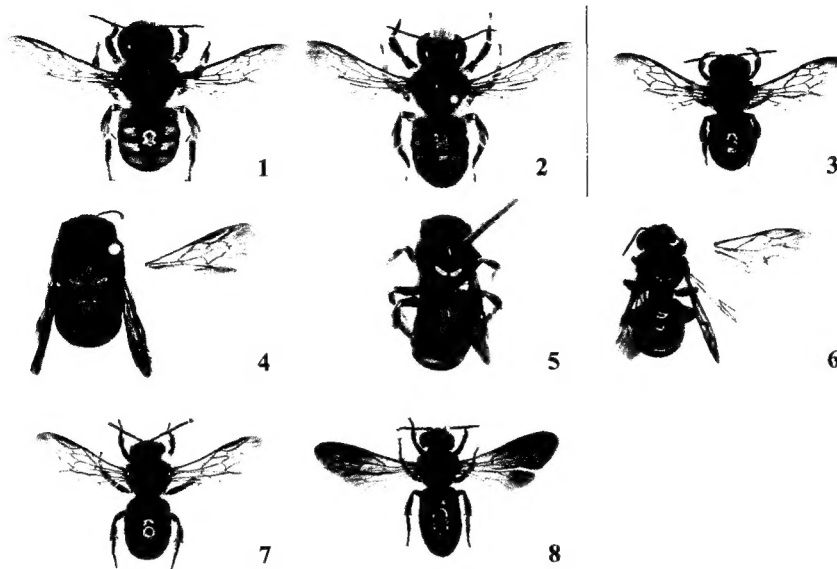
Male- Body color similar to female. Clypeus yellow. Tergum 7 with 3 denticles in the posterior margin.

Body length. Female- 8 mm, Male- 10 mm.

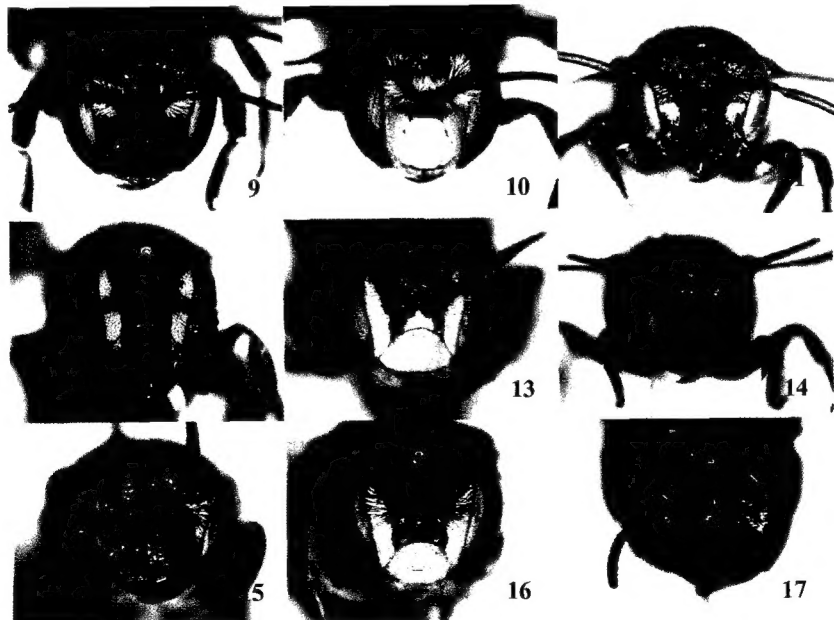
Materials examined. [YU] <GW> 1 ♀, Mt. Bangtaesan, 1 VIII 1995 (S.M. Ryu); <GN> 1 ♂, Mt. Kayasan, 8 V 1960.

Distribution. Korea, Russia.

Remarks. This species is new to Korea.



Figs 1-8. Adults of tribe Anthidiini: 1. *Anthidium septemspinosum* ♀; 2. *Anthidium septemspinosum* ♂; 3. *Anthidium sibiricum* ♀; 4. *Anthidiellum strigatum* ♀; 5. *Lasanthidium malaisei* ♀; 6. *Lasanthidium malaisei* ♂; 7. *Stelis malanura* ♂; 8. *Euaspis basalis* ♀.



Figs 9-17. Heads of tribe Anthidiini: 9. *Anthidium septemspinosum* ♀; 10. *Anthidium septemspinosum* ♂; 11. *Anthidium sibiricum* ♀; 12. *Lasanthidium malaisei* ♀; 13. *Lasanthidium malaisei* ♂; 14. *Stelis malanura* ♂; 15. *Anthidiellum strigatum* ♀; 16. *Anthidiellum strigatum* ♂; 17. *Euaspis basalis* ♀.

Genus *Stelis* Panzer, 1806

Stelis Panzer, 1806 Krit. Rev. der Insektenfauna v.5: 246. Type species: *Apis aterrima* Panzer, 1798.

Diagnosis. Small (3–8 mm) and middle-sized (9–12 mm) cleptoparasitic bees. Black with sparse light pubescence and light coloured or reddish brown apical margin of terga, sometimes with yellow maculae laterally. Punctures of head, abdominal terga and particularly scutum and scutellum coarse. Metasomal sterna black or reddish-brown, apical margins smooth, with a process or emargination in the middle. Legs black, reddish-yellow, front and hind tibiae with teeth sometimes with long spines.

The genus *Stelis* is distributed in Holarctic region.

***Stelis melanura* Cockerell, 1924** 검정알락가위벌 (신칭)

(Figs 7, 14)

Stelis aterrima melanura Cockerell, 1924: 526.

Stelis melanura: Romankova, 1995: 534.

Euaspis (*Pareuaspis*) *carbonaria* Yasumatsu, 1937 (nec Smith, 1854): 142–143; Anonymous, 1994: 267 (misident.).

Description. Female– Robust, small sized species. All body black. Face with a small ridge between antennal sockets. Metasomal sterna without scopa.

Male – Similar to Female in the body color and size.

Body length. Female– 10 mm, Male– 10 mm.

Materials examined. [ASNU] <GB> 2♀, 1♂, Uiseong, 31 V1998 (H.S. Lee), Nest trap.

Distribution. Korea, Russia (Siberia).

Remarks. This is new to Korea. This is a cuckoo bee of *Anthidium septemspinossus* Repeletier.

ACKNOWLEDGMENTS

We would like to express our thanks to Professor Jin-Il Kim in Sungshin Women's University, Professor Jong-Wook Lee in Yeungnam University and Dr. Seung-Hwan Lee and June-Yeol Choi in NIAST for the loan of many specimens. Especially, we are grateful to Professor Osamu Tadauchi in Kyushu University, Japan and Dr. Charles D. Michener in Kansas University, U.S.A. for sending many specimens and papers.

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(Received: July 2, 2001)

(Accepted: October 31, 2001)